CLAIMS

I claim:

1. A management system coupled to a first and a second network element connected to a data communication network and being managed by a network manager also connected to the data communication network, the management system comprising:

a management network coupled to the first and second network elements, the management network supporting a standardized network interface; and

a processor element coupled to the management network and communicating with the first and second network elements through the management network, the processor element being capable of processing management transactions,

wherein a first management transaction is transmitted to the first network element and a second management transaction is transmitted to the second network element from the network manager through the data communication network, the first and second management transactions are transmitted through the management network to the processor element, and the processor element processes the first and second management transactions on behalf of the first and the second network elements respectively.

2. The management system of claim 1, wherein processing management transactions comprises interpreting network management requests from the network manager, forming and sending responses to the network manager, forming instructions for manipulating hardware components of the network elements coupled thereto, and sending notifications to the network manager.

3. The management system of claim 1, wherein the processor element comprises an embedded processor in the first network element.

4. The management system of claim 3, wherein the first network element comprises a multi-port network element, the second network element being coupled to one of the ports of the first network element to form the management network.

5. The management system of claim 1, wherein the management network comprises a network implementing the Ethernet network interface.

6. The management system of claim 1, wherein the first and second network elements and the processor element communicate using a data frame of the standardized network interface, the data frame comprising a header field specifying the source and destination addresses, the length of the data frame, a protocol identifier field for identifying the communication protocol being used, and a management protocol data unit field for specifying personality artifacts of the network elements.

7. The management system of claim 6, wherein the management protocol data unit field comprises a subtype field for specifying the device type of the network element, a version field for specifying the version of the device type and a subtype data unit field for specifying other personality artifacts of the network element.

8. The management system of claim 1, wherein the management system comprises a plurality of processor elements coupled to the management network and the processor element

comprises a first processor element of the plurality of possessor elements, the plurality of processor elements each capable of processing management transactions on behalf of one or more network elements.

9. The management system of claim 8, wherein the first processor element comprises the primary processor element of the management system operating to at least manage the functions of the other processor elements.

10. The management system of claim 9, wherein the primary processor element operates to distribute and assign management tasks among the other ones of the plurality of processor elements.

11. The management system of claim 9, wherein the first and second network elements are part of a plurality of network elements being coupled to the management system, and wherein the primary processor element implements load sharing by assigning a second processor element to handle management transactions for a first group of network elements and a third processor element to handle management transactions for a second group of network elements.

12. The management system of claim 8, wherein at least one of the plurality of processor elements is designated as a redundant processor to be activated when another one of the plurality of processor elements is inoperative.

13. The management system of claim 1, wherein the first and second management transactions are transmitted through the management network to the processor element by transmitting

messages from the first and second network elements to the processor element which messages contain the management transactions.

14. The management system of claim 1, wherein the first and second management transactions are transmitted through the management network to the processor element by the processor element reading respective memory locations of the first and second network elements to retrieve the management transactions.

15. A method for processing a management transaction transmitted by a network manager over a data communication network and designated for a managed network element connected to the data communication network, the method comprising:

coupling the managed network element to a processor element through a management network implementing a standardized network interface;

transmitting a message from the managed network element to the processor element containing information identifying the personality artifacts of the managed network element;

providing the management transaction to the processor element;

processing the management transaction at the processor element; and

transmitting a message from the processor element to the managed network element in response to and in accordance with the management transaction.

16. The method of claim 15, wherein prior to transmitting a message from the managed network element to the processor element, the method comprises:

transmitting a broadcast message from the processor element over the management network, the broadcast message requesting any managed network element connected to the management network to transmit a message in response identifying the address of the responding managed network element.

17. The method of claim 16, wherein transmitting a message from the managed network element to the processor element comprises:

transmitting a message to the processor element identifying the address of the managed network element and specifying the personality artifacts of the managed network element.

18. The method of claim 17, wherein the standardized network interface comprises an Ethernet network interface and wherein transmitting a message to the processor element comprises:

encapsulating the message in a data frame, the data frame comprising a header field specifying the source address of the managed network element and the destination address of the message, a protocol identifier field for identifying the communication protocol being used, and a management protocol data unit field for specifying personality artifacts of the managed network element sending the message.

19. The method of claim 15, wherein coupling the managed network element to a processor element through a management network comprises:

coupling a plurality of processor elements to the management network;

transmitting a message over the management network to the plurality of processor elements;

at each processor element, receiving messages from the other ones of the plurality of processor element identifying the presence of the processor elements; and

selecting a first processor element as the primary processor element for operating to at least manage the functions of the other of the plurality of processor elements.

20. The method of claim 19, wherein transmitting a message over the management network to the plurality of processor elements comprises transmitting a broadcast message over the management network to the plurality of processor elements.

21. The method of claim 19, wherein transmitting a message over the management network to the plurality of processor elements comprises transmitting a multicast message over the management network to the plurality of processor elements.

22. The method of claim 19, further comprising:

assigning by the primary processor element management tasks among the other ones of the plurality of processor elements.

23. The method of claim 19, wherein coupling the managed network element to a processor element through a management network comprises coupling a plurality of managed network elements to the plurality of processor elements through the management network, and the method further comprises:

assigning by the primary processor element one or more managed network elements from among the plurality of managed network elements to be managed by a second processor element of the plurality of processor elements.

24. The method of claim 19, further comprising:

assigning a second processor element of the plurality of processor elements as a redundant processor to be activated when another one of the plurality of processor elements is inoperative.

25. The method of claim 15, wherein providing the management transaction to the processor element comprises:

sending a message containing the management transaction from the managed network element to the processor element through the management network.

26. The method of claim 15, wherein providing the management transaction to the processor element comprises:

retrieving by the processor element the management transaction by reading the management transaction from memory locations of the managed network element.